IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Rozman, Gregory I.
Serial No.:	10/806,635
Filed:	03/23/2004
Group Art Unit:	2837
Examiner:	Glass, Erick David
Title:	POWER CONVERTER FOR AN ELECTRIC ENGINE START SYSTEM

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant submits this brief in response to the notice of non-compliant appeal brief mailed June 6, 2007. That notice indicated that the specification references (i.e., page and line number) were not provided for claim 1 but the top of page 3 did. To avoid any delay in the processing of this appeal, applicant has simply copied that text into the space between the quoted claims 1 and 9.

Real Party in Interest

The real party is interest is Hamilton Sundstrand Corporation.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of the Claims

Claims 1-20 are pending and on appeal.

Claims 1-6, 9-17 and 19-20 stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 4,992,721 (the *Latos* reference) in view of U.S. Patent No. 5,574,345 (the *Yoneta, et al.* reference).

Claim 7 stands rejected under 35 U.S.C. §103 as being unpatentable over the *Latos* and *Yoneta, et al.* references and further in view of the Published U.S. Application No. 2004/0008527 (the *Honda* reference).

Claims 8 and 18 stand rejected under 35 U.S.C. §103 as being unpatentable over the *Latos* and *Yoneta, et al.* references in further view of U.S. Patent No. 6,426,608 (the *Amano, et al.* reference).

Status of Amendments

There are no unentered amendments.

Summary of Claimed Subject Matter

Independent claim 1is as follows:

> 1. A system for starting an engine and generating power while the engine is running, comprising:
>
> a permanent magnet motor;
>
> a first phase controlled rectifier associated with the motor for selectively coupling the motor to a power source for providing power to the motor from the power source during an engine starting operation; and
>
> a second phase controlled rectifier associated with the motor for selectively coupling the motor to a load, for providing power from the motor to the load if the permanent magnet motor is coupled with the engine and rotating simultaneously with the engine and the engine is running.

Figure 1 schematically illustrates an example arrangement upon which claims 1 and 9 read. In Figure 9, an assembly 20 includes a permanent magnet motor 26 that is associated with an engine 24 such that the motor 26 and the engine 24 rotate simultaneously. (Page 4, lines 2-3). A first phase controlled rectifier 30 selectively couples

the motor 26 to a power source 32 while starting the engine 24. (Page 4, line 4 and lines 7-12). A second phase controlled rectifier 38 couples the motor 26 to a load 28 to provide power generated by the motor 26 to the load 28 when the engine 24 is running. (Page 4, lines 19-22).

Independent claim 9 recites:

> 9. A method of controlling power distribution using an engine starting system having a permanent magnet motor associated with the engine such that the motor and the engine rotate simultaneously, comprising the steps of:
>
> coupling the motor to a power source using a first phase controlled rectifier while starting the engine; and
>
> coupling the motor to a load using a second phase controlled rectifier to provide power generated by the motor to the load when the engine is running.

Figure 1 schematically illustrates an example arrangement upon which claims 1 and 9 read. In Figure 9, an assembly 20 includes a permanent magnet motor 26 that is associated with an engine 24 such that the motor 26 and the engine 24 rotate simultaneously. (Page 4, lines 2-3). A first phase controlled rectifier 30 selectively couples the motor 26 to a power source 32 while starting the engine 24. (Page 4, line 4 and lines 7-12). A second phase controlled rectifier 38 couples the motor 26 to a load 28 to provide power generated by the motor 26 to the load 28 when the engine 24 is running. (Page 4, lines 19-22).

Independent claim 16 provides:

> 16. A gas turbine engine assembly, comprising:
> a gas turbine engine;
> a permanent magnet motor at least selectively coupled with the engine such that the motor and corresponding portions of the engine rotate simultaneously;
> a power converter in series with the motor;
> a first phase controlled rectifier in series with the power converter on an opposite side of the converter from the motor;
> a second phase controlled rectifier in series the power converter between the power converter and the motor; and
> a controller that controls the first phase controlled rectifier to couple the motor to a power source for starting the engine and enables the second phase controlled rectifier to couple the motor to a load for providing power to the load when the engine is running.

Figure 1 schematically illustrates an example assembly upon which claim 16 reads. A gas turbine engine assembly 20 includes a gas turbine engine 24 and a permanent magnet motor 26. (Page 4, lines 2-6). A power converter 36 is in series with the motor 26. (Page 4, line 13). A first phase controlled rectifier 30 is in series with the power converter 36 on an opposite side of the converter 36 from the motor 26. (Page 4, lines 7-8). A second phase controlled rectifier 38 is in series with the power converter 36 between the power converter 36 and the motor 26. (Page 4, lines 19-20). A controller 40 controls the first phase controlled rectifier 30 to couple the motor 26 to a power source 36 for starting the engine 24 and enables the second phase controlled rectifier 38 to couple the motor 26 to a load 28 for providing power to the load 28 when the engine 24 is running. (Page 4, lines 7-24 and page 5, lines 7-8).

Grounds of Rejection to be Reviewed on Appeal

Claims 1-6, 9-17 and 19-20 stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 4,992,721 (the *Latos* reference) in view of U.S. Patent No. 5,574,345 (the *Yoneta, et al.* reference).

Claim 7 stands rejected under 35 U.S.C. §103 as being unpatentable over the *Latos* and *Yoneta, et al.* references and further in view of the Published U.S. Application No. 2004/0008527 (the *Honda* reference).

Claims 8 and 18 stand rejected under 35 U.S.C. §103 as being unpatentable over the *Latos* and *Yoneta, et al.* references in further view of U.S. Patent No. 6,426,608 (the *Amano, et al.* reference).

ARGUMENT

When a proposed combination defeats an intended purpose or function of the primary reference, that combination cannot be made and there is no *prima facie* case of obviousness. When a proposed combination does not provide any benefit in the context of the primary reference, that combination cannot be made and there is no *prima facie* case of obviousness. In this instance, the Examiner's proposed combination of the *Latos* and *Yoneta, et al.* references defeats an intended result of the *Latos* reference, provides no benefit in the context of the *Latos* reference or both. Therefore, there is no *prima facie* case of obviousness because the proposed combination cannot be made.

The Rejection Under 35 U.S.C. §103 of Claims 1-6, 9-17 and 19-20 Based Upon the Proposed Combination of the *Latos* and *Yoneta, et al.* References Must Be Reversed.

The *Latos* reference teaches a variable-speed, constant frequency power conversion system that operates in a generating mode to convert variable-speed motive power produced by a prime mover 12, such as an aircraft jet engine, into constant-frequency AC electrical power which is delivered through controllable contactors 14A-14B, 14C to a load bus 16. (*Latos*, column 3, lines 40-46). It is important to note that the *Latos* reference expressly intends to provide three phase AC power to the load bus 16. "During operation in the generating mode, the generator 22 develops polyphase, variable-frequency AC power which is converted into DC power by a rectifier/filter 26. The resulting DC power is provided over conductors 30a, 30b of a DC link 30 to a polyphase inverter 32 according to the present invention which converts the DC power into three-phase, constant-frequency AC power. This AC power may be filtered by an optional filter 34 and is provided via the set of controllable contactors 14a-14c to the load bus 16." (*Latos*, column 3, line 65 – column 4, line 7).

The Examiner proposes to add a rectifier circuit 4 (Figure 3 of the *Yoneta, et al.* reference) to the *Latos* arrangement. This proposed modification cannot be made for two independently dispositive reasons.

First, if the Examiner intends to insert the *Yoneta, et al.* rectifier in a position where it would rectify the AC power to be delivered to the load bus 16, that would defeat the expressly intended result of the *Latos* reference. Such a combination cannot be made and

there is no *prima facie* case of obviousness. The *Latos* reference cannot be modified to eliminate the AC power that *Latos* intentionally provides to the load bus 16.[1]

Second, even if the Examiner does not intend to rectify the AC power provided to the load bus 16, the proposed combination of the *Latos* and *Yoneta, et al.* references cannot be made. Adding a rectifier somewhere within the circuitry of the *Latos* reference would be redundant because *Latos* already has a rectifier/filter 26. Therefore, adding the rectifier of the *Yoneta, et al.* reference would be redundant, at best, and would provide no benefit in the context of the *Latos* reference. Without any benefit resulting from a proposed combination, the combination cannot be made and there is no *prima facie* case of obviousness.

For either of the reasons mentioned above, the proposed combination of the *Latos* and *Yoneta, et al.* references cannot be made and none of Applicant's claims can be considered obvious.

The Rejection of Claim 7 Under 35 U.S.C. §103 Based Upon the Proposed Combination of the *Latos*, *Yoneta, et al.* and *Honda* References Must Be Reversed.

As already explained, the *Latos* and *Yoneta, et al.* references cannot be combined. Additionally, there is no motivation for adding the teachings of the *Honda* reference to the improper combination of the *Latos* and *Yoneta, et al.* references. There is no explanation for how the teachings of *Honda* extracted by the Examiner would provide any benefit in the context of the *Latos* reference (alone or as improperly modified by the *Yoneta, et al.* reference). Without any benefit resulting from a proposed combination, that combination cannot be made and there is no *prima facie* case of obviousness. Claim 7 cannot possibly be considered obvious.

[1] During the prosecution it appeared that the Examiner's supposed motivation for making the combination

The Rejection of Claims 8 and 18 under 35 U.S.C. §103 Based Upon the Proposed Combination of the *Latos, Yoneta, et al.* and *Amano, et al.* Referentes Must Be Reversed.

As already explained, the base combination cannot be made. If the pulse width modulation of the *Amano, et al.* reference were added as proposed by the Examiner, that would be for "changing the control system to digital." As already explained, the *Latos* reference expressly teaches providing AC power to the load bus 16. If one were to make the Examiner's proposed modification based upon the *Amano, et al.* reference, that would defeat the intended operation of the *Latos* reference. Such a modification to the *Latos* reference is not permissible. There is no *prima facie* case of obviousness because the proposed combination cannot be made.

CONCLUSION

All rejections must be reversed because none of the Examiner's proposed combinations can be made. Each of them defeats an intended result expressly taught by the primary reference. Additionally, there is no benefit resulting from any of the Examiner's proposed modifications to the primary reference. Since the references cannot be combined as proposed by the Examiner, there is no *prima facie* case of obviousness against any of Applicant's claims.

Respectfully submitted,

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July 5, 2007
Date

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was to rectify *Latos'* AC power. If that is the Examiner's intended combination, that cannot be done as mentioned above.

CERTIFICATE OF FACSIMILE

I hereby certify that this Appeal Brief, relative to Application Serial No. 10,806,635, is being facsimile transmitted to the Patent and Trademark Office (Fax No. (571) 273-8300) on July 5, 2007.

Theresa M. Palmateer

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APPENDIX OF CLAIMS

1. A system for starting an engine and generating power while the engine is running, comprising:

a permanent magnet motor;

a first phase controlled rectifier associated with the motor for selectively coupling the motor to a power source for providing power to the motor from the power source during an engine starting operation; and

a second phase controlled rectifier associated with the motor for selectively coupling the motor to a load, for providing power from the motor to the load if the permanent magnet motor is coupled with the engine and rotating simultaneously with the engine and the engine is running.

2. The system of claim 1, wherein the first and second phase controlled rectifiers are switched such that one is conducting while the other is off.

3. The system of claim 1, including a power converter associated with the first phase controlled rectifier for converting power from the source to a variable voltage, variable frequency power supplied to the motor during the engine starting operation.

4. The system of claim 1, including a DC link capacitor bank between the first phase controlled rectifier and the motor and wherein the first phase controlled rectifier controls an amount of current provided to the capacitor bank when the power source begins to provide power to the motor.

5. The system of claim 1, wherein the second phase controlled rectifier converts power generated by the motor into a constant DC voltage and including a power converter associated with the second phase controlled rectifier for converting the constant DC voltage into AC power supplied to the load.

6. The system of claim 5, including at least one filter between the inverter and the load to provide a selected power quality.

7. The system of claim 6, wherein the at least one filter comprises a differential mode filter in series with a common mode filter.

8. The system of claim 1, including a pulse width modulating converter in series with the phase controlled rectifiers for converting power supplied to the motor or received from the motor into a desired state.

9. A method of controlling power distribution using an engine starting system having a permanent magnet motor associated with the engine such that the motor and the engine rotate simultaneously, comprising the steps of:

coupling the motor to a power source using a first phase controlled rectifier while starting the engine; and

coupling the motor to a load using a second phase controlled rectifier to provide power generated by the motor to the load when the engine is running.

10. The method of claim 9, including enabling one of the first or second phase controlled rectifiers when the other is disabled.

11. The method of claim 9, including converting power from the source to a variable voltage, variable frequency power supplied to the motor while starting the engine.

12. The method of claim 9, including using the first phase controlled rectifier to control an amount of current provided to a capacitor bank between the power source and the motor.

13. The method of claim 9, including using the second phase controlled rectifier to convert power generated by the motor into a constant DC voltage.

14. The method of claim 13, including converting the constant DC voltage into AC power supplied to the load.

15. The method of claim 14, including filtering the power supplied to the load to provide a selected power quality.

16. A gas turbine engine assembly, comprising:

a gas turbine engine;

a permanent magnet motor at least selectively coupled with the engine such that the motor and corresponding portions of the engine rotate simultaneously;

a power converter in series with the motor;

a first phase controlled rectifier in series with the power converter on an opposite side of the converter from the motor;

a second phase controlled rectifier in series the power converter between the power converter and the motor; and

a controller that controls the first phase controlled rectifier to couple the motor to a power source for starting the engine and enables the second phase controlled rectifier to couple the motor to a load for providing power to the load when the engine is running.

17. The assembly of claim 16, wherein the controller disables one of the phase controlled rectifiers when the other is enabled.

18. The assembly of claim 16, wherein the power converter comprises a pulse width modulating inverter.

19. The assembly of claim 16, including a filter between the power converter and the load for filtering power generated by the motor and converted by the power converter before the converted power is provided to the load.

20. The assembly of claim 19, wherein the filter provides a selected quality of power to the load.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.